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PTO/SB/05 (08-00)
Approved for use through 10/31/2000. OMB 0651-0032
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	05871.0010.CNUS03
First Inventor	Thomas M. Brennan
Title	Method and Apparatus for Performing Large Numbers of Reactions...
Express Mail	EL615212541US

APPLICATION ELEMENTS

See MPEP Chapter 600 concerning utility patent application contents.

ADDRESS TO: Commissioner for Patents, Box Patent Application, Washington, DC 20231

1. ☒ Fee Transmittal Form (PTO/SB/17) (Submit an original, and a duplicate for fee processing)
2. ☒ Applicant claims small entity status. See 37 CFR 1.27.
3. ☒ Specification [Total Pages 84] (preferred arrangement set forth below)
   - -Descriptive title of the invention
   - -Cross reference to Related Applications
   - -Statement Regarding Fed Sponsored R & D
   - -Reference to sequence listing, a table, or a computer program listing appendix
   - -Background of the Invention
   - -Brief Summary of the Invention
   - -Detailed Description
   - -Claim(s)
   - -Abstract of the Disclosure
4. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 30]
5. ☒ Oath or Declaration [Total Pages 4]
   - a. ☐ Newly executed (original or copy)
   - b. ☒ Copy from a prior application (37 CFR 1.63 (d)) (for continuational divisional with Box 17 completed)
     - i. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ Application Data Sheet. See 37 CFR 1.76
7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
8. ☒ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
   - a. ☐ Computer Readable Form (CRF)
   - b. Specification Sequence Listing on:
     - i. ☐ CD-ROM or CD-R (2 copies); or
     - ii. ☐ paper
   - c. ☒ Statements verifying identity of above copies

01008 U.S. PTO 10/602998 06/23/03

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney (when there is an assignee)
11. ☐ English Translation Document (if applicable)
12. ☐ Information disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Other: .....

17. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: 09/686,597 filed October 10, 2000

Prior application information: Examiner Jefffrey Siew Group I Art Unit: 1637

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

18. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label 27194 or ☐ Correspondence address below

Name	HOWREY SIMON ARNOLD & WHITE, LLP				
Address	301 Ravenswood Avenue				
	P.O. Box 34				
City	Menlo Park	State	CA	Zip Code	94025
Country	USA	Telephone	650-463-8100	Fax	650-463-8400

NAME (Print/Type)	Albert P. Halluin/Wallace Wu Registration No. 25,227/45,380		
Signature		Date	June 23, 2003

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1. PTO/SB/17 (09-00)
Approved for use through 10/31/2000. OMB 0651-003
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL For FY 2002

Patent fees are subject to annual revision.

TOTAL AMOUNT OF PAYMENT	($) 551.00

Complete if Known	
Application Number	Not yet Assigned
Filing Date	June 23, 2003
First Named Inventor	Thomas M. Brennan
Examiner Name	Jeffrey Siew
Group Art Unit	1637
Attorney Docket No.	05871.0010.CNUS03

METHOD OF PAYMENT

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit Acct. No. **08-3038**

Deposit Account Name **Howrey Simon Arnold & White, LLP**

☒ Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

☒ Applicant claims small entity status. See 37 CFR 1.27

2. ☒ **Payment Enclosed:**
☒ Check ☐ Credit card ☐ Money Order ☐ Other

FEE CALCULATION

1. BASIC FILING FEE

Large Fee Code	Entity Fee ($)	Small Fee Code	Entity Fee ($)	Fee Description	Fee Paid
101	750	201	375	Utility filing fee	375.00
106	330	206	165	Design filing fee	
107	510	207	255	Plant filing fee	
108	740	208	370	Reissue filing fee	
114	160	214	80	Provisional filing fee	

SUBTOTAL (1) ($) 375.00

2. EXTRA CLAIM FEES

			Extra Claims		Fee from below		Fee Paid
Total Claims	24	-20** =	4	X	9	=	36
Independent Claims	1	- 3** =	0	X	42	=	0
Multiple Dependent					140	=	140

Large Fee Code	Entity Fee ($)	Small Fee Code	Entity Fee ($)	Fee Description
103	18	203	9	Claims in excess of 20
102	84	202	42	Independent claims in excess of 3
104	280	204	140	Multiple dependent claim, if not paid
109	80	209	40	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)176.00

***or number previously paid, If greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Fee	Entity Fee	Small Fee	Entity Fee	Fee Description	Fee Paid
105	130	205	65	Surcharge – late filing fee or oath	
127	50	227	25	Surcharge – late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for *ex parte* reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	400	216	200	Extension for reply within second month	
117	920	217	460	Extension for reply within third month	
118	1,440	218	720	Extension for reply within fourth month	
128	1,960	228	980	Extension for reply within fifth month	
119	320	219	160	Notice of Appeal	
120	320	220	160	Filing a brief in support of an appeal	
121	280	221	140	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive – unavoidable	
141	1,280	241	640	Petition to revive – unintentional	
142	1,280	242	640	Utility issue fee (or reissue)	
143	460	243	230	Design issue fee	
144	620	244	310	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	180	126	180	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	740	246	370	Filing a submission after final rejection (37 CFR § 1.129(a)	
149	740	249	370	For each additional invention to be examined (37 CFR § 1.129(b)	
179	740	279	370	Request for Continued Examination (RCE)	
169	900	169	900	Request for expedited examination of a design application	

Other fee (specify) ____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($)0

SUBMITTED BY				Complete *(if applicable)*	
Name *(Print/Type)*	Albert P. Halluin, Wallace Wu	Registration No. (Attorney/Agent)	25,227, 45,380	Telephone	650-463-8109
Signature				Date	June 23, 2003

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METHOD AND APPARATUS FOR PERFORMING LARGE NUMBERS OF REACTIONS USING ARRAY ASSEMBLY

This application claims priority to U.S. Provisional Application Serial No. 60/158,315, filed October 8, 1999 and to U.S. Application Serial No. 09/686,597, filed October 10, 2000.

FIELD OF THE INVENTION

The present invention relates to a method and apparatus for performing a large number of reactions using array assembly. In particular, the present invention features a method and apparatus for performing a large number of chemical and biological reactions by bringing two arrays into close apposition and allowing reactants on the surfaces of two arrays to come into contact. The present invention is exemplified by performing a large number of polynucleotide amplification reactions using array assembly. In addition, the present invention features a method and apparatus for coupling the amplification of polynucleotides and the detection of sequence variations, expression levels, and functions thereof.

BACKGROUND OF THE INVENTION

Intense efforts are under way to map and sequence the human genome and the genomes of many other species. In June 2000, the Human Genome Project and Celera Genomics announced that a rough draft of the human genome had been completed. This information, however, represents only a reference sequence of the 3-billion-base human genome. The remaining task lies in the determination of sequence variations (*e.g.*, mutations, polymorphisms, haplotypes) and sequence functions, which are important for the study, diagnosis, and treatment of human genetic diseases.

In addition to the human genome, the mouse genome is being sequenced. Genbank provides about 1.2% of the 3-billion-base mouse genome and a rough draft of the mouse genome is expected to be available by 2003 and a finished genome by 2005. The Drosophila Genome Project has also been completed recently. Thus far, genomes of more than 30 organisms have been sequenced.

Traditional nucleic acid sequencing methods include the chemical cleavage method (or the Maxam-Gilbert method) and the chain termination method (or the Sanger method) (Sambrook *et al.*, *Molecular Cloning: A Laboratory Manual*, 2nd Ed., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1989). The basic strategy for the chemical cleavage method is to specifically cleave the end-labeled DNA at only one